APPENDIX B

BLANK PRE-EMS, POST-EMS, AND CORPORATE SURVEYS

Pre-Environmental Management System (EMS) Survey for the EMS Implementation Study

A joint study by

United States Environmental Protection Agency Region 1

and

United Technologies Corporation

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Overview and Introduction

In 1993, the United States Environmental Protection Agency (EPA) and United Technologies Corporation (UTC) filed a consent decree in the United States District Court for the District of Connecticut settling a multimedia enforcement action. Under the settlement, UTC agreed to develop and implement environmental management systems (EMS) in all of its facilities in New England (currently 19, including Hamilton Standard Division, Pratt & Whitney Division, Sikorsky Aircraft Division, and UT Research Division). EPA and UTC seek to understand the causes of noncompliance and specifically the relationship between environmental performance and the existence and level of implementation of EMSs at the facility level.

Included with this survey is a facility-specific profile that presents the findings of violation as noted in the second amended and supplemental complaint filed by EPA in 1990.

The objectives of this project are to:

- Quantify the effect the implementation of an EMS has on compliance
- Quantify the changes in root causes of noncompliance before and after implementation of an EMS at a facility
- Determine whether the level of implementation and acceptance of an EMS has a measurable effect on compliance or on the root causes of noncompliance

For this project, root cause analysis is the process of: (1) identifying factors that caused or contributed to a noncompliance event, (2) evaluating what can be done to prevent such incidents from recurring, and (3) identifying opportunities to improve compliance practices and EMSs.

Overview and Introduction

The survey contains six sections. Only Sections 1 through 5 require responses. **Section 6 is for reference only.** Please complete all the items in sections 1 through 5. Thank you for your cooperation and support.

Section	Title	Purpose
1	Facility Information	Establish a profile of the facilities completing the survey
2	Root and Contributing Causes	Determine the root and contributing causes of noncompliance
3	Response to the Noncompliance	Identify the actions taken to address noncompliance events; evaluate how a facility verified the effectiveness of the actions; and describe lessons learned
4	Elements of an Environmental Management System	Evaluate the status of EMS elements
5	Pollution Prevention and Waste Minimization	Evaluate the status of pollution prevention and waste minimization activities
6	Definitions of Noncompliance Categories	Provide definitions for completing Section 2

The following definitions apply to terms used in this survey.

Environmental impact - any change in the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products, and services.

Environmental management system - the part of the overall management system of a facility that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining the environmental policy.

Environmental performance - measurable results of the environmental management system, related to an organization's control of its environmental aspects, based on its environmental policy, objectives, and targets.

Pollution prevention - use of processes, practices, or products that avoid or reduce the generation of pollutants before recycling, treatment, or disposal, which may include source reduction and closed-loop (within-process) recycling, as well as conserving such resources as energy and water.

Product stewardship - incorporation of health, safety, and environmental protection as an integral part of a product's life cycle, from manufacture, marketing, and distribution to use, recycling, and disposal.

SECTION 1

The purpose of this section is to collect facility information that is important in supporting the analysis of responses. Please respond NA, or not applicable, to items that are not applicable to the facility.

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1. Please provide the **primary** four-digit Standard Industrial Classification (SIC) code of the facility in 1990.

2. How many employees worked at the facility in 1990?
(Please check one box each for A and B.)

A. Full-time employees

☐ 0-9 ☐ 10-49 ☐ 50-100 ☐ 101-500 ☐ More than 500

B. Full-time contractors

☐ 0-9 ☐ 10-49 ☐ 50-100 ☐ 101-500 ☐ More than 500

3. What are the job responsibilities of the person(s) completing this survey?
(Check all that apply.)

☐ Compliance staff ☐ Operator ☐ Environmental engineer

☐ Corporate management ☐ Plant management ☐ Engineer (other than environmental)

☐ Other (specify) _____

4. Identify the activities performed at the facility in 1990 (for example, production, packaging, storage, and research and development).

_____

_____

5. What were the total standard hours for the facility in 1990? _____

SECTION 1 — Facility Information

6. Did the facility employ the following essential elements of a management system in 1990?

   Circle Y (Yes) or N (No).

	Essential Elements of a Environmental Management System	Present Today	
A.	**Policy and Leadership**		
1.	Written environmental policy or mission statement	**Y**	**N**
2.	Written environment, health, and safety (EH&S) policy defined by top management that sets forth management's philosophy, commitment, and goals and expectations	**Y**	**N**
3.	Written EH&S policy includes explicit commitment to regulatory compliance	**Y**	**N**
4.	Written EH&S policy includes explicit commitment to pollution prevention	**Y**	**N**
5.	Philosophy of continuous improvement is integrated into environmental policy	**Y**	**N**
6.	Written EH&S policy available to employees	**Y**	**N**
7.	Written EH&S policy available to customers	**Y**	**N**
8.	Written EH&S policy available to suppliers	**Y**	**N**
9.	Written EH&S policy available to the public	**Y**	**N**
10.	Communication of EH&S policy to all employees	**Y**	**N**
11.	Communication of EH&S policy to all customers	**Y**	**N**
12.	Communication of EH&S policy to all suppliers	**Y**	**N**
13.	Annual review of EH&S policy	**Y**	**N**
14.	Senior operations managers demonstrate commitment and leadership by ensuring EH&S is incorporated into the business decision-making process (for example, purchasing, engineering, and manufacturing)	**Y**	**N**
15.	Senior operations managers demonstrate commitment and leadership by participating in EH&S activities with employees (for example, meetings, inspections, and audits)	**Y**	**N**
16.	Senior operations managers demonstrate commitment and leadership by fostering participation in external groups	**Y**	**N**
17.	Written procedures define how the operation implements the EH&S policy	**Y**	**N**
B.	**Organization**		
1.	Formal lines of authority and responsibility and accountability for environmental management established	**Y**	**N**
2.	Committee established to direct and coordinate the overall EH&S program	**Y**	**N**
3.	Scheduled meetings of the EH&S committee	**Y**	**N**
4.	Environmental managers have organizational stature, independence, and authority to implement environmental programs and to make decisions about environmental protection	**Y**	**N**
5.	EH&S technical staff available to provide technical consulting or advice	**Y**	**N**
6.	Written EH&S implementation plan for all tenants sharing the site	**Y**	**N**
7.	System in place to ensure that appropriate procedures, programs, and activities exist	**Y**	**N**
8.	System in place to ensure that personnel who have environmental responsibilities have relevant background and training	**Y**	**N**
9.	System in place to ensure that adequate technical skills are available to the operation	**Y**	**N**
10.	System in place to ensure employee participation in the development and implementation of EH&S programs and activities	**Y**	**N**

SECTION 1 — Facility Information

Essential Elements of a Environmental Management System		Present Today	
B.	**Organization (continued)**		
11.	System in place to review and approve operation-wide policies, plans, programs, and other initiatives	**Y**	**N**
12.	System in place to provide direction to line and functional staff	**Y**	**N**
13.	System in place for tracking and interpreting new federal, state, and local regulations and changes in such regulations and updating facility policies and directives for the organization's response	**Y**	**N**
14.	System in place to ensure that environmental reports required by federal and state regulations are prepared routinely and submitted on a timely basis	**Y**	**N**
15.	EH&S technical coordinator (senior level) in place for each operation	**Y**	**N**
16.	EH&S technical coordinator in place to assess EH&S conditions and advise management of appropriate prevention and control strategies	**Y**	**N**
17.	Staff participation in EH&S management system throughout all functional areas (for example, finance, marketing, purchasing, and engineering)	**Y**	**N**
C.	**Planning**		
1.	Written annual EH&S plan incorporated into the overall operation's business plan	**Y**	**N**
2.	Annual plan includes numerical targets and goals	**Y**	**N**
3.	Annual plan includes objectives and activities to achieve targets and goals	**Y**	**N**
4.	Annual plan addresses risk reduction	**Y**	**N**
5.	Annual plan addresses compliance with legal and company or corporate policies and standards	**Y**	**N**
6.	Annual plan specifies timing and responsibility for completion	**Y**	**N**
D.	**Accountability**		
1.	Written accountability system includes the achievement of EH&S goals	**Y**	**N**
2.	Accountability system holds all employees accountable for assigned responsibilities and activities to attain EH&S goals and objectives	**Y**	**N**
3.	Accountability system holds all employees accountable for complying with EH&S policies, rules, procedures, regulations, and environmental performance	**Y**	**N**
4.	Accountability system holds operations and functional management accountable for management practices in the area of responsibility of each	**Y**	**N**
5.	Accountability system addresses recognition of superior performance	**Y**	**N**
6.	Accountability system addresses incorporation of EH&S performance into the operation's pay-for-performance program	**Y**	**N**
7.	Accountability system addresses incorporation of EH&S into job descriptions and performance appraisals, as a key element of each	**Y**	**N**
E.	**Assessment, Prevention, and Control**		
1.	Process in place to continually identify, assess, and set priorities among EH&S hazards and risks	**Y**	**N**
2.	Preventive maintenance program developed and implemented to ensure proper operation of pollution control equipment	**Y**	**N**
3.	Strategy in place to effectively manage risks; strategy defines prevention methods and controls that would eliminate or minimize inherent risks	**Y**	**N**

Essential Elements of a Environmental Management System		Present Today	
E.	**Assessment, Prevention, and Control (continued)**		
4.	Employee medical program in place that complies with local laws, promotes health, and provides treatment for and management of occupational injury or illness	**Y**	**N**
5.	Emergency planning and response capability in place that includes measures to protect people, the environment, and property from fire and explosion, chemical spills or releases, natural disasters, or any other major risk to people or the environment	**Y**	**N**
6.	Written emergency action plan in place	**Y**	**N**
7.	Integration of EH&S into the product development and procurement process	**Y**	**N**
F.	**Education and Training**		
1.	Initial training curriculum in place that includes EH&S policy	**Y**	**N**
2.	For a new job responsibility or a change in process, initial training curriculum in place specific to that job responsibility	**Y**	**N**
3.	Refresher training program in place	**Y**	**N**
4.	Mandatory training program in place that includes EH&S policy (and other management policy) that provides specific EH&S requirements that are conditions of employment	**Y**	**N**
5.	Job-specific training curriculum in place that addresses hazards, risks, and prevention and control practices	**Y**	**N**
6.	Documented training program and tracking system in place	**Y**	**N**
G.	**Communications**		
1.	Documented communication plan in place for internal communication of EH&S issues and information	**Y**	**N**
2.	Documented communication plan in place for external communication of EH&S issues and information	**Y**	**N**
3.	Documented communication plan for discussing EH&S performance, including progress toward goals and activities and accomplishments, as well as incidents and rules, procedures, and general awareness	**Y**	**N**
4.	Process in place to collect and analyze comments as a component of EH&S program evaluation	**Y**	**N**
5.	Process in place to provide technology transfer to other parts of the operation and to external entities about EH&S lessons learned	**Y**	**N**
H.	**Rules and Procedures**		
1.	Written EH&S rules and procedures in place and integrated into work instructions	**Y**	**N**
2.	EH&S rules and procedures based on hazards, risks, applicable regulatory requirements, and company standards	**Y**	**N**
3.	EH&S rules and procedures reviewed with affected employees	**Y**	**N**
4.	Compliance with EH&S rules and procedures enforced by operations management	**Y**	**N**
5.	Violation of EH&S rules and procedures treated in same fashion as violation of other company rules and procedures	**Y**	**N**

SECTION 1 — Facility Information

Essential Elements of a Environmental Management System		Present Today	
I.	**Inspections and Audits**		
1.	Inspection and audit programs in place (evaluate implementation of programs, procedures, and policies; evaluate relevant physical conditions; evaluate action of employees)	**Y**	**N**
2.	Corrective action program in place (findings and deficiencies identified during inspections and audits reviewed to identify appropriate corrective action, including timely and effective implementation)	**Y**	**N**
3.	Environmental compliance audits conducted at least every three years	**Y**	**N**
4.	Audits conducted by persons independent of the unit subject to the compliance audit	**Y**	**N**
5.	Results of compliance audits reported directly to facility management	**Y**	**N**
6.	Periodic audits of the environmental management system conducted	**Y**	**N**
7.	Independent assurance reviews conducted periodically by corporate EH&S staff	**Y**	**N**
J.	**Incident Investigations**		
1.	Written procedure in place for reporting and investigation of incidents	**Y**	**N**
2.	Incident investigation tracking system in place	**Y**	**N**
3.	Routine root cause analysis completed for incidents	**Y**	**N**
4.	Corrective action program in place (findings and deficiencies identified during incidents reviewed to identify appropriate corrective action, including timely and effective implementation)	**Y**	**N**
K.	**Documents and Records Management**		
1.	System in place to create, distribute, control, and manage documents and records prepared in support of the EH&S program	**Y**	**N**
2.	Designated point of contact in place for records related to the environmental management system.	**Y**	**N**
3.	Written description of the environmental management system in place that describes its organizational and functional structure and elements.	**Y**	**N**
L.	**Program Evaluation**		
1.	Annual evaluation of EH&S management system's implementation and effectiveness	**Y**	**N**
2.	Annual assessment of facility's overall regulatory compliance	**Y**	**N**
3.	Regular review of environmental management system by top management to ensure adequacy and effectiveness	**Y**	**N**
4.	Tracking system in place to measure progress toward attainment of goals of the EH&S program	**Y**	**N**
5.	Periodic reviews to ensure integrity and efficacy of environmental management system and revisions made as necessary	**Y**	**N**
6.	Corrective action program in place (findings and deficiencies identified during program evaluation reviewed to identify appropriate corrective actions and incorporate appropriate corrective actions in the annual EH&S plan)	**Y**	**N**

SECTION 1 — Facility Information

7. In 1990, had the facility made an inventory of current or potential environmental impacts associated with its operations, services, and products?

☐ NO ☐ YES If YES, which? ☐ Current ☐ Potential

If yes, did an inventory of environmental impacts affect the facility's ability to manage compliance with environmental regulations?

Explain briefly the level of detail contained in the inventory of environmental impacts and how the inventory has been used.

8. What indicators (for example, environmental indicators such as fines, or pollution prevention indicators such as wastewater discharge) were **in use** in 1990? Please list them in the table below, indicating how they were used and any associated goals or targets established. Please indicate as well whether each item was selected in response to a regulatory requirement.

Indicator	How Used	Goal/Target	Regulatory Requirement?
a.			**Y** **N**
b.			**Y** **N**
c.			**Y** **N**
d.			**Y** **N**
e.			**Y** **N**
f.			**Y** **N**
g.			**Y** **N**

SECTION 1 — Facility Information

Please provide the 1990 values for the indicators listed above (following the example provided).

Indicator	Non-normalized Value	Normalization Factor	Normalized Value
Wastewater discharge	100,000 gal/day	1,000,000 pounds product	0.1 gal/day/pound
a.			
b.			
c.			
d.			
e.			
f.			
g.			

9. In 1990, had the facility participated in community outreach activities (for example, reporting of environmental performance, involvement in conservation activities, or marketing energy use)?

☐ NO ☐ YES

If yes, briefly describe the activities and the motivation for participating.

SECTION 2

Several factors can cause or contribute to an incident of noncompliance. The purpose of this section is to determine the **root** and **contributing causes** of the violation(s) listed in the facility profile provided with this survey.

A **root cause** is a primary factor in an incident of noncompliance. For this survey, please identify no more than three root causes for each noncompliance code.

A **contributing cause** is a secondary factor in an incident of noncompliance.

Please follow these instructions for completing the table in this section:

Step 1: Root Cause. In the following table, enter each noncompliance code from the facility profile in the **Root Cause** column next to items that were primary factors in the noncompliance. **For the Root Cause column, enter each noncompliance code no more than three times.**

Step 2: Contributing Cause. On the same table, enter the appropriate noncompliance code from the facility profile in the **Contributing Cause** column next to each item that was a secondary factor in the noncompliance. **Please note that you may enter a noncompliance code in the Contributing Cause column as many times as necessary to describe the secondary factors.**

Categories and Items	Root Cause	Contributing Cause
Human Error		
1. Individual responsibility or professional judgment	_____	_____
2. Fatigue, lack of alertness, distraction	_____	_____
3. Inexperience, lack of knowledge, lack of technical expertise	_____	_____
4. Other (specify) _____	_____	_____
Policies		
5. Unavailable policy	_____	_____
6. Unclear policy	_____	_____
7. Environmental objectives and targets unclear	_____	_____
8. Policy not followed	_____	_____
9. Pollution control technologies or other technical equipment needs not assessed	_____	_____
10. Other (specify) _____	_____	_____

SECTION 2 — Root and Contributing Causes

Categories and Items	Root Cause	Contributing Cause
Procedures		
11. Operating procedure not followed	_____	_____
12. Operating procedure unclear or out-of-date	_____	_____
13. Difficulty in relating operating procedures to actual facility operations and products	_____	_____
14. No written operating procedures available	_____	_____
15. Record keeping procedures inadequate	_____	_____
16. Definition of roles and responsibilities unclear	_____	_____
17. Reporting or notification procedures unclear	_____	_____
18. Pre-startup review omitted or inadequate	_____	_____
19. Other (specify) _____	_____	_____
Management		
20. No formal management structure to address noncompliance and follow-through	_____	_____
21. Management organization undefined	_____	_____
22. Management support or guidance not provided	_____	_____
23. Staffing - inappropriate level or expertise	_____	_____
24. Environmental aspects of facility process and operations not identified	_____	_____
25. Control and oversight of purchased materials, equipment, and services not provided or inadequate	_____	_____
26. Environmental planning or budgeting not completed	_____	_____
27. Result of economic competition	_____	_____
28. Other (specify) _____	_____	_____
Training		
29. Employee not trained	_____	_____
30. Training materials unclear or outdated	_____	_____
31. Training not available	_____	_____
32. Training requirements unclear	_____	_____
33. Other (specify) _____	_____	_____

SECTION 2 — Root and Contributing Causes

Categories and Items	Root Cause	Contributing Cause
Communications - difficulties between		
34. Employees	_____	_____
35. Management and employee	_____	_____
36. Facility and regulatory agencies	_____	_____
37. Other (specify) _____	_____	_____
Emergency Preparedness		
38. Emergency preparedness plan unavailable	_____	_____
39. Emergency preparedness plan insufficient	_____	_____
40. Implementation issues related to the emergency preparedness plan	_____	_____
41. Other (specify) _____	_____	_____
Process Upset or Failure - as a result of		
42. Over pressure	_____	_____
43. Over temperature	_____	_____
44. Runaway reaction	_____	_____
45. Raw material	_____	_____
46. Other (specify) _____	_____	_____
Compliance Monitoring		
47. Audit program insufficient	_____	_____
48. Audit follow-up procedures insufficient	_____	_____
49. Routine site and equipment compliance checks not conducted		
50. No system to ensure timely submittal of environmental reports to regulatory agency	_____	_____
51. Insufficient environmental data	_____	_____
52. Other (specify) _____	_____	_____

SECTION 2 — Root and Contributing Causes

Categories and Items	Root Cause	Contributing Cause
Regulations and Permits		
53. Conflicting permit conditions	_____	_____
54. Ambiguous federal regulations	_____	_____
55. Ambiguous state regulations	_____	_____
56. Regulatory change not communicated by regulatory agency	_____	_____
57. Contradiction between state and federal regulations	_____	_____
58. Inconsistent or contradictory federal regulations	_____	_____
59. Inconsistent or contradictory state regulations	_____	_____
60. Inconsistent or contradictory interpretation of federal regulations	_____	_____
61. Inconsistent or contradictory interpretation of state regulations	_____	_____
62. Facility unaware of applicability of a regulation	_____	_____
63. Rule implementation time frames are too short	_____	_____
64. Other (specify) _____	_____	_____
External Circumstances		
65. An act outside the control of the individuals who operate the process	_____	_____
66. External phenomenon (for example, weather, theft, flood, or fire)	_____	_____
67. Contracted services, such as haulers or handlers	_____	_____
68. Other (specify) _____	_____	_____
Equipment Problems (see the follow-up question on page 14)		
69. Design or installation	_____	_____
70. Equipment maintenance	_____	_____
71. Ordinary wear and tear	_____	_____
72. Site and equipment inspections not conducted	_____	_____
73. Failure to follow up on exceptions noted in inspections	_____	_____
74. Other (specify) _____	_____	_____

SECTION 2 — Root and Contributing Causes

Categories and Items	Root Cause	Contributing Cause
Other Categories or Items (specify)		
75. _____	_____	_____
76. _____	_____	_____
77. _____	_____	_____

Complete the following ONLY if you identified equipment problems as a cause on page 13. Complete the next line to identify which equipment problem you are describing. Check (✔) the appropriate box in the left column to indicate the type of equipment involved and then identify all functions lost using the key at the right.

Item Number _____ **Noncompliance Code** _____

Type of equipment:	**Function(s) lost:**
☐ Piping	_____
☐ Tanks, vessels, reactors	_____
☐ Pumps, compressors, blowers, turbines (rotating equipment)	_____
☐ Motors	_____
☐ Heat exchangers	_____
☐ Control valves	_____
☐ Solids handling	_____
☐ Instrumentation	_____
☐ Other (specify) _____	_____

Key:

a Containment

b Process control

c Active mitigation (mechanical systems)

d Passive mitigation (natural systems or intrinsic processes)

e Material transport

f Other (specify) _____

(Use the forms on the next page to describe additional items, if necessary.)

SECTION 3

The purpose of this section is to identify the actions taken to address the violation(s) identified in the facility profile provided with the survey, to identify how the facility verified the effectiveness of those actions, and to describe the lessons learned.

For each action taken, complete all columns. *NOTE: If you need more space, please make copies of the page provided; it follows page 16.*

List the associated noncompliance codes (from the facility profile)	List all specific actions related to the noncompliance taken to prevent recurrence, including development or enhancements of procedures, corporate policies, or EMSs.	How did the facility verify that the action taken would ensure compliance? (For example, was the action verified through a self-assessment audit, root cause analysis, etc.?)	Describe any lessons learned and with whom the facility shared those lessons (for example, trade associations).
a.			
b.			
c.			

SECTION 3 — Response to the Noncompliance

List the associated noncompliance codes (from the facility profile)	List all specific actions related to the noncompliance taken to prevent recurrence, including development or enhancements of procedures, corporate policies, or EMSs.	How did the facility verify that the action taken would ensure compliance? (For example, was the action verified through a self-assessment audit, root cause analysis, etc.?)	Describe any lessons learned and with whom the facility shared those lessons (for example, trade associations).
d.			
e.			
f.			
g.			

SECTION 4

The table in this section presents a list of elements that typically are part of an EMS. The purpose of this section is to collect information that will allow comparison of EMS systems, UTC's management system SP001, and data collected in other root cause analysis projects.

Please read the descriptions below and check the appropriate response.

		Part of facility procedures in 1990?	
		Yes (✔)	No (✔)
A.	**Policy and Leadership**		
1.	Goals and objectives statement includes an environmental policy statement.		
2.	Top management defines environmental policy and sets goals and expectations for environmental performance.		
3.	Philosophy of continuous improvement is integrated into the environmental policy.		
4.	Environmental policy includes an explicit written commitment to regulatory compliance and pollution prevention.		
5.	Environmental policy is communicated to all levels of the workforce and is available to the public.		
B.	**Planning**		
1.	Environmental planning is part of the budget and business development process.		
2.	Planning process includes establishment of specific objectives and targets with time frames.		
C.	**Implementation, Operation, and Accountability**		
1.	Formal lines of authority and responsibility and accountability for environmental management have been established.		
2.	Environmental managers have organizational stature, independence, and authority to implement environmental programs and to make decisions about environmental protection.		
3.	Responsibility for environmental management is incorporated into personnel evaluations, rewards, and incentives.		
4.	A system is in place to review environmental procedures and update them periodically.		
5.	A system is in place for tracking and interpreting new federal, state, and local regulations and changes in such regulations and updating facility policies and directives for the organization's response.		
6.	Responsibility and accountability for environmental performance are shared by staff employees and managers at all levels.		

SECTION 4 — Elements of an Environmental Management System

		Part of facility procedures in 1990?	
		Yes (✔)	No (✔)
C.	**Implementation, Operation, and Accountability (continued)**		
7.	A system is in place through which employees can communicate about environmental issues and concerns directly with top management or environmental managers.		
8.	A system is in place to ensure that personnel who have environmental responsibilities have the relevant background and training to carry out their responsibilities.		
9.	A system is in place to ensure that environmental reports required by federal and state regulations are prepared routinely and submitted on a timely basis.		
10.	Procedures are established to identify the potential for and response to emergency situations.		
D.	**Performance Measurement and Corrective Action**		
1.	A preventive maintenance program has been developed and implemented to ensure proper operation of pollution control equipment.		
2.	Environmental compliance audits are conducted at least every three years.		
3.	Audits are conducted by persons independent of the unit that is the subject of the compliance audit.		
4.	Results of compliance audits are reported directly to facility management.		
5.	A formal system is in place for follow-up of exceptions noted in inspections or audits and supported by management review.		
6.	Periodic audits of the management system are conducted at the facility.		
7.	The integrity and efficacy of the management system are reviewed periodically and revisions are made as necessary.		
8.	A written description of the management system is in place that describes its organizational and functional structure and elements.		
9.	A designated point of contact is in place for records related to the management system.		
E.	**Management Review and Reporting**		
1.	Top management reviews the EMS regularly to ensure its continuing adequacy and effectiveness.		
2.	Documented review addresses possible need for changes in policy, objectives, and other elements of the EMS.		

SECTION 5

1. Was the facility engaged in pollution prevention activities in 1990?

   ☐ Yes ☐ No

   If yes, for how long had the facility been engaged in those activities? _____

2. Was a pollution prevention plan required by state law in 1990?

   ☐ Yes ☐ No

3. Did the facility have a pollution prevention plan in 1990?

   ☐ Yes ☐ No

   If yes, when did the facility adopt this plan? _____

4. Please indicate on the check list below which elements of a pollution prevention program were in place at the facility in 1990.

Elements of a Pollution Prevention Program	Present in 1990	
A. Policy, Leadership, and Accountability		
1. Designated pollution prevention goals with specific targets for reduction of volume or toxicity	**Y**	**N**
2. Senior operations managers demonstrate commitment and leadership by fostering participation in pollution prevention work groups	**Y**	**N**
B. Organization		
1. Established formal pollution prevention team at the facility level	**Y**	**N**
2. Established formal pollution prevention team at the operations level	**Y**	**N**
3. Established partnership with federal, regional, or state pollution prevention agencies and organizations	**Y**	**N**
4. Employed available federal, state, or other pollution prevention resources, such as agency publications or information clearinghouses	**Y**	**N**

SECTION 5 — Pollution Prevention and Waste Minimization

Elements of a Pollution Prevention Program	Present in 1990	
C. Planning		
1. Developed a facility environmental baseline (in addition to those chemicals and quantities that must be reported to the Toxic Release Inventory under section 313 of the Emergency Planning and Community Right-to-Know Act [EPCRA])	**Y**	**N**
2. Developed a site map as part of the facility environmental baseline. The site map includes the following elements:	**Y**	**N**
A. Discharge points ("outfalls") and the types of pollutants likely to be discharged to each drainage area	**Y**	**N**
B. Discharge patterns and direction of flow	**Y**	**N**
C. Surface-water bodies, including any proximate stream, river, lake, or other body of water that receives storm water discharges from the site	**Y**	**N**
D. Structural control measures (physically constructed features used to control storm water flows)	**Y**	**N**
E. Locations of significant materials exposed to storm water	**Y**	**N**
F. Locations of industrial activities	**Y**	**N**
3. Developed a materials inventory for all pollutants that are produced, handled, stored, treated, or disposed of on-site	**Y**	**N**
4. Identified all sources that generate waste	**Y**	**N**
5. Conducted a pollution prevention opportunity assessment	**Y**	**N**
6. Developed priorities and rank for facility wide pollution prevention activities	**Y**	**N**
7. Established numerical target goals for reducing pollution by a certain amount and a schedule with milestone dates for achieving those goals	**Y**	**N**
8. Identification of obstacles to implementing the pollution prevention plan	**Y**	**N**
9. Use less energy or fewer materials to perform a task by designing new production processes or modifying existing ones or by improving maintenance	**Y**	**N**
10. Consider pollution prevention opportunities from a multimedia perspective (that is, considering air, water, and land as a unified whole, while avoiding the transfer of risk from one medium to another)	**Y**	**N**
11. Application of environmental management hierarchy throughout pollution prevention decision making (that is, source reduction has the highest priority, recycling is the next preferable approach, and treatment and disposal is the last-resort measure)	**Y**	**N**
12. Changing inputs or reducing the reliance on toxic or hazardous raw materials by substituting non-toxic for toxic feedstocks in the manufacture of a product	**Y**	**N**
13. Implementation or participation in EPA's "33/50" Program for the reduction of 17 identified chemical wastes	**Y**	**N**
14. Substitution of environmentally-preferable products for chlorofluorocarbons (CFC) or other ozone-depleting compounds	**Y**	**N**

SECTION 5 — Pollution Prevention and Waste Minimization

Elements of a Pollution Prevention Program	Present in 1990	
C. Planning (continued)		
15. Expanded time horizon analysis for evaluating true economic benefits and costs of pollution prevention	**Y**	**N**
16. Annual plan addresses compliance with legal and company or corporate policies and standards for pollution prevention	**Y**	**N**
17. Annual plan defines timing and responsibility for completion of pollution prevention activities	**Y**	**N**
18. Developed product stewardship plans for all products	**Y**	**N**
D. Rules and Procedures		
1. Perform total cost accounting (or full cost environmental accounting) to allocate direct and indirect costs to specific products and processes	**Y**	**N**
2. Include pollution prevention considerations in production decision making	**Y**	**N**
3. A formal procedure is in place to review pollution prevention opportunities for each new process or process modification	**Y**	**N**
E. Assessment, Control, and Prevention		
1. Maintain a waste tracking system to track all waste generated by type and by process	**Y**	**N**
2. Replace hazardous chemicals with less toxic alternatives that have equivalent performance specifications	**Y**	**N**
3. Improve materials management practices to prevent expiration of or damage to products	**Y**	**N**
4. Consider environmentally conscious design elements for any activity that reduces waste generation through operation and maintenance changes	**Y**	**N**
5. Routinely check storage areas and containers for leaks and spills	**Y**	**N**
6. Maintain equipment in good working order to extend its useful life	**Y**	**N**
7. Keep work areas neat and organized to reduce the chance of spills or releases of chemicals	**Y**	**N**
F. Education and Training		
1. Initial training curriculum is in place that includes pollution prevention policy and practices, risk and hazards, and source reduction opportunities	**Y**	**N**
2. Initial baseline training for engineers and follow-up periodic training on UTC's "Design for Environment" issues	**Y**	**N**
G. Communications		
1. Process is in place to collect and evaluate the comments of **internal** sources as a component of evaluation of the pollution prevention program	**Y**	**N**
2. Written pollution prevention policies and activities available to suppliers	**Y**	**N**
3. Written pollution prevention policies and activities available to customers	**Y**	**N**

SECTION 5 — Pollution Prevention and Waste Minimization

Elements of a Pollution Prevention Program	Present in 1990	
G. Communications (continued)		
4. Written pollution prevention policies and activities available to the public	**Y**	**N**
5. Process is in place to collect and evaluate the comments of **external** sources as a component of evaluation of the pollution prevention program	**Y**	**N**
H. Inspections and Audits		
1. Annual pollution prevention audits performed to identify new opportunities for waste reduction	**Y**	**N**
I. Program Evaluation and Results		
1. Annual review of pollution prevention policy	**Y**	**N**
2. Annual evaluation of implementation and effectiveness of the pollution prevention plan	**Y**	**N**
3. Annual review and analysis of tracking system data to measure progress toward pollution prevention goals and objectives	**Y**	**N**
4. Experienced fewer work-related injuries and exposures of workers to hazardous substances	**Y**	**N**
5. Experienced reduced liability for on- and off-site treatment, storage, and disposal	**Y**	**N**

SECTION 5 — Pollution Prevention and Waste Minimization

5. Did pollution prevention activities at the facility meet the following criteria for success in 1990?

a. Improved compliance with applicable federal, state, and local environmental requirements and regulations	**Y**	**N**
Please explain _____		
b. Reduced waste management operations or costs and the purchase of raw materials	**Y**	**N**
Please explain _____		
c. Reduced the probability that the facility might cause environmental contamination that may result in environmental liabilities	**Y**	**N**
Please explain _____		
d. Improved the productivity of staff by providing a cleaner, healthier working environment through reduction of the amounts of toxic materials used	**Y**	**N**
Please explain _____		
e. Increased efficiency through innovative pollution prevention techniques identified and implemented under the pollution prevention program	**Y**	**N**
Please explain _____		

SECTION 6

For Reference Only - For Use in Completing Sections 2 and 3

Character Term

A Corrective Action Activities
Although not necessarily indicative of noncompliance with regulations, this category addresses corrective action activities imposed by a legal agreement such as a º3008(h) or º3013 order under RCRA.

B Equipment/Unit Design
Noncompliance resulting from design deficiencies for structures, systems, or resources.

C Exceedance
Failure to meet discharge limit(s), as defined in the facility's permit or by regulation.

D Failure to Respond
Failure to respond to an information request.

E Labeling
General noncompliance with regulations that require labels and placards.

F Legal Agreement
Failure to correct a violation in accordance with any agreement or to achieve a milestone as required under any agreement.

G Monitoring/Detection/Control
Failure to comply with monitoring, detection, or control requirements.

H Operations and Maintenance
General noncompliance of an operational and maintenance nature, such as: the use of defective containers; failure to close hazardous waste containers; lack of aisle space in storage areas; or failure to perform required inspections, calibrations, and maintenance of any equipment.

Character Term

J Record Keeping (incomplete or late)
Noncompliance related to operating records or files, not maintained in accordance with regulations. Includes failure to maintain training records as required by regulation and failure to file complete and accurate manifest reports.

K Report Submissions and Reporting
General failures to submit required reports or the submittal of incomplete or inaccurate reports to the regulating agencies. Includes failure to report spills or releases to the regulating agencies in a timely manner, as defined by regulation.

L Spills/Releases
Noncompliance related to spills or releases.

M Testing
Failure to perform sampling or analysis in accordance with prescribed procedures or permit criteria.

N Training/Certification
Failure to train environmental personnel in the performance of their duties, as specified by regulation (includes inadequate training and failure to conduct refresher training). Includes lack of training and certification records and failure to provide certification training.

O Unpermitted/Unauthorized Activity
Noncompliance resulting from unpermitted or unauthorized activities or equipment. Includes noncompliance with permit requirements and failure to obtain a permit or authorization.

P Waste Identification
Failure to identify or characterize waste as required by regulation.

SECTION 6 — Definitions of Noncompliance Categories / Statutes

Statutes

Character	Statute
1	Clean Air Act (CAA)
2	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
3	Clean Water Act (CWA)
4	Emergency Planning and Community Right-to-Know Act (EPCRA)
5	Resource Conservation and Recovery Act (RCRA)
6	Toxic Substances Control Act (TSCA)

Post-Environmental Management System (EMS) Survey for the EMS Implementation Study

A joint study by

United States Environmental Protection Agency Region 1

and

United Technologies Corporation

June 29, 1999

If you have any questions about this survey, please contact:

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Overview and Introduction

In 1993, the United States Environmental Protection Agency (EPA) and United Technologies Corporation (UTC) filed a consent decree in the United States District Court for the District of Connecticut settling a multimedia enforcement action. Under the settlement, UTC agreed to develop and implement environmental management systems (EMS) in all of its facilities in New England (currently 19, including Hamilton Standard Division, Pratt & Whitney Division, Sikorsky Aircraft Division, and UT Research Division). EPA and UTC seek to understand the causes of noncompliance and specifically the relationship between environmental performance and the existence and level of implementation of EMSs at the facility level.

Included with this survey is a facility-specific profile that presents the findings of violation as noted in the Haley & Aldrich compliance audit. The profile included with this survey was developed by UTC.

The objectives of this project are to:

- Quantify the effect the implementation of an EMS has on compliance
- Quantify the changes in root causes of noncompliance before and after implementation of an EMS at a facility
- Determine whether the level of implementation and acceptance of an EMS has a measurable effect on compliance or on the root causes of noncompliance

For this project, root cause analysis is the process of: (1) identifying factors that caused or contributed to a noncompliance event, (2) evaluating what can be done to prevent such incidents from recurring, and (3) identifying opportunities to improve compliance practices and EMSs.

Overview and Introduction

The survey contains five sections. Only Sections 1 through 4 require responses. **Section 5 is for reference only.** Please complete all the items in sections 1 through 4. Thank you for your cooperation and support.

Section	Title	Purpose
1	Facility Information	Establish a profile of the facilities completing the survey
2	Root and Contributing Causes	Determine the root and contributing causes of noncompliance
3	Response to the Noncompliance	Identify the actions taken to address noncompliance events; evaluate how a facility verified the effectiveness of the actions; and describe lessons learned
4	Pollution Prevention and Waste Minimization	Evaluate the status of pollution prevention and waste minimization activities
5	Definitions of Noncompliance Categories	Provide definitions for completing Section 2

The following definitions apply to terms used in this survey.

Environmental impact - any change in the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products, and services.

Environmental management system - the part of the overall management system of a facility that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining the environmental policy.

Environmental performance - measurable results of the environmental management system, related to an organization's control of its environmental aspects, based on its environmental policy, objectives, and targets.

Pollution prevention - use of processes, practices, or products that avoid or reduce the generation of pollutants before recycling, treatment, or disposal, which may include source reduction and closed-loop (within-process) recycling, as well as conserving such resources as energy and water.

Product stewardship - incorporation of health, safety, and environmental protection as an integral part of a product's life cycle, from manufacture, marketing, and distribution to use, recycling, and disposal.

SECTION 1

The purpose of this section is to collect facility information that is important in supporting the analysis of responses. Please respond NA, or not applicable, to items that are not applicable to the facility.

---

1. Please provide the **primary** four-digit Standard Industrial Classification (SIC) code of the facility.

2. How many employees are located at the facility?
(Please check one box each for A and B.)

   A. Full-time employees

   ☐ 0-9 ☐ 10-49 ☐ 50-100 ☐ 101-500 ☐ More than 500

   B. Full-time contractors

   ☐ 0-9 ☐ 10-49 ☐ 50-100 ☐ 101-500 ☐ More than 500

3. What are the job responsibilities of the person(s) completing this survey?
(Check all that apply.)

   ☐ Compliance staff ☐ Operator ☐ Environmental engineer

   ☐ Corporate management ☐ Plant management ☐ Engineer (other than environmental)

   ☐ Other (specify) _____

4. Identify the activities currently performed at the facility (for example, production, packaging, storage, and research and development).

   _____

   _____

5. How many years has the facility been in operation (as of today)?

   ☐ 1-5 ☐ 6-10 ☐ More than 10

6. What is the total standard hours for the facility (for 1998)? _____

SECTION 1 — Facility Information

7. Does the facility employ the following essential elements of an environmental management system in 1990? Circle Y (Yes) or N (No).

Essential Elements of a Environmental Management System		Present Today	
A.	**Policy and Leadership**		
1.	Written environmental policy or mission statement	**Y**	**N**
2.	Written environment, health, and safety (EH&S) policy defined by top management that sets forth management's philosophy, commitment, and goals and expectations	**Y**	**N**
3.	Written EH&S policy includes explicit commitment to regulatory compliance	**Y**	**N**
4.	Written EH&S policy includes explicit commitment to pollution prevention	**Y**	**N**
5.	Philosophy of continuous improvement is integrated into environmental policy	**Y**	**N**
6.	Written EH&S policy available to employees	**Y**	**N**
7.	Written EH&S policy available to customers	**Y**	**N**
8.	Written EH&S policy available to suppliers	**Y**	**N**
9.	Written EH&S policy available to the public	**Y**	**N**
10.	Communication of EH&S policy to all employees	**Y**	**N**
11.	Communication of EH&S policy to all customers	**Y**	**N**
12.	Communication of EH&S policy to all suppliers	**Y**	**N**
13.	Annual review of EH&S policy	**Y**	**N**
14.	Senior operations managers demonstrate commitment and leadership by ensuring EH&S is incorporated into the business decision-making process (for example, purchasing, engineering, and manufacturing)	**Y**	**N**
15.	Senior operations managers demonstrate commitment and leadership by participating in EH&S activities with employees (for example, meetings, inspections, and audits)	**Y**	**N**
16.	Senior operations managers demonstrate commitment and leadership by fostering participation in external groups	**Y**	**N**
17.	Written procedures define how the operation implements the EH&S policy	**Y**	**N**
B.	**Organization**		
1.	Formal lines of authority and responsibility and accountability for environmental management established	**Y**	**N**
2.	Committee established to direct and coordinate the overall EH&S program	**Y**	**N**
3.	Scheduled meetings of the EH&S committee	**Y**	**N**
4.	Environmental managers have organizational stature, independence, and authority to implement environmental programs and to make decisions about environmental protection	**Y**	**N**
5.	EH&S technical staff available to provide technical consulting or advice	**Y**	**N**
6.	Written EH&S implementation plan for all tenants sharing the site	**Y**	**N**
7.	System in place to ensure that appropriate procedures, programs, and activities exist	**Y**	**N**
8.	System in place to ensure that personnel who have environmental responsibilities have relevant background and training	**Y**	**N**
9.	System in place to ensure that adequate technical skills are available to the operation	**Y**	**N**
10.	System in place to ensure employee participation in the development and implementation of EH&S programs and activities	**Y**	**N**

SECTION 1 — Facility Information

Essential Elements of a Environmental Management System		Present Today	
B.	**Organization (continued)**		
11.	System in place to review and approve operation-wide policies, plans, programs, and other initiatives	**Y**	**N**
12.	System in place to provide direction to line and functional staff	**Y**	**N**
13.	System in place for tracking and interpreting new federal, state, and local regulations and changes in such regulations and updating facility policies and directives for the organization's response	**Y**	**N**
14.	System in place to ensure that environmental reports required by federal and state regulations are prepared routinely and submitted on a timely basis	**Y**	**N**
15.	EH&S technical coordinator (senior level) in place for each operation	**Y**	**N**
16.	EH&S technical coordinator in place to assess EH&S conditions and advise management of appropriate prevention and control strategies	**Y**	**N**
17.	Staff participation in EH&S management system throughout all functional areas (for example, finance, marketing, purchasing, and engineering)	**Y**	**N**
C.	**Planning**		
1.	Written annual EH&S plan incorporated into the overall operation's business plan	**Y**	**N**
2.	Annual plan includes numerical targets and goals	**Y**	**N**
3.	Annual plan includes objectives and activities to achieve targets and goals	**Y**	**N**
4.	Annual plan addresses risk reduction	**Y**	**N**
5.	Annual plan addresses compliance with legal and company or corporate policies and standards	**Y**	**N**
6.	Annual plan specifies timing and responsibility for completion	**Y**	**N**
D.	**Accountability**		
1.	Written accountability system includes the achievement of EH&S goals	**Y**	**N**
2.	Accountability system holds all employees accountable for assigned responsibilities and activities to attain EH&S goals and objectives	**Y**	**N**
3.	Accountability system holds all employees accountable for complying with EH&S policies, rules, procedures, regulations, and environmental performance	**Y**	**N**
4.	Accountability system holds operations and functional management accountable for management practices in the area of responsibility of each	**Y**	**N**
5.	Accountability system addresses recognition of superior performance	**Y**	**N**
6.	Accountability system addresses incorporation of EH&S performance into the operation's pay-for-performance program	**Y**	**N**
7.	Accountability system addresses incorporation of EH&S into job descriptions and performance appraisals, as a key element of each	**Y**	**N**
E.	**Assessment, Prevention, and Control**		
1.	Process in place to continually identify, assess, and set priorities among EH&S hazards and risks	**Y**	**N**
2.	Preventive maintenance program developed and implemented to ensure proper operation of pollution control equipment	**Y**	**N**
3.	Strategy in place to effectively manage risks; strategy defines prevention methods and controls that would eliminate or minimize inherent risks	**Y**	**N**

Essential Elements of a Environmental Management System		Present Today	
E.	**Assessment, Prevention, and Control (continued)**		
4.	Employee medical program in place that complies with local laws, promotes health, and provides treatment for and management of occupational injury or illness	**Y**	**N**
5.	Emergency planning and response capability in place that includes measures to protect people, the environment, and property from fire and explosion, chemical spills or releases, natural disasters, or any other major risk to people or the environment	**Y**	**N**
6.	Written emergency action plan in place	**Y**	**N**
7.	Integration of EH&S into the product development and procurement process	**Y**	**N**
F.	**Education and Training**		
1.	Initial training curriculum in place that includes EH&S policy	**Y**	**N**
2.	For a new job responsibility or a change in process, initial training curriculum in place specific to that job responsibility	**Y**	**N**
3.	Refresher training program in place	**Y**	**N**
4.	Mandatory training program in place that includes EH&S policy (and other management policy) that provides specific EH&S requirements that are conditions of employment	**Y**	**N**
5.	Job-specific training curriculum in place that addresses hazards, risks, and prevention and control practices	**Y**	**N**
6.	Documented training program and tracking system in place	**Y**	**N**
G.	**Communications**		
1.	Documented communication plan in place for internal communication of EH&S issues and information	**Y**	**N**
2.	Documented communication plan in place for external communication of EH&S issues and information	**Y**	**N**
3.	Documented communication plan for discussing EH&S performance, including progress toward goals and activities and accomplishments, as well as incidents and rules, procedures, and general awareness	**Y**	**N**
4.	Process in place to collect and analyze comments as a component of EH&S program evaluation	**Y**	**N**
5.	Process in place to provide technology transfer to other parts of the operation and to external entities about EH&S lessons learned	**Y**	**N**
H.	**Rules and Procedures**		
1.	Written EH&S rules and procedures in place and integrated into work instructions	**Y**	**N**
2.	EH&S rules and procedures based on hazards, risks, applicable regulatory requirements, and company standards	**Y**	**N**
3.	EH&S rules and procedures reviewed with affected employees	**Y**	**N**
4.	Compliance with EH&S rules and procedures enforced by operations management	**Y**	**N**
5.	Violation of EH&S rules and procedures treated in same fashion as violation of other company rules and procedures	**Y**	**N**

SECTION 1 — Facility Information

Essential Elements of a Environmental Management System		Present Today	
I.	**Inspections and Audits**		
1.	Inspection and audit programs in place (evaluate implementation of programs, procedures, and policies; evaluate relevant physical conditions; evaluate action of employees)	**Y**	**N**
2.	Corrective action program in place (findings and deficiencies identified during inspections and audits reviewed to identify appropriate corrective action, including timely and effective implementation)	**Y**	**N**
3.	Environmental compliance audits conducted at least every three years	**Y**	**N**
4.	Audits conducted by persons independent of the unit subject to the compliance audit	**Y**	**N**
5.	Results of compliance audits reported directly to facility management	**Y**	**N**
6.	Periodic audits of the environmental management system conducted	**Y**	**N**
7.	Independent assurance reviews conducted periodically by corporate EH&S staff	**Y**	**N**
J.	**Incident Investigations**		
1.	Written procedure in place for reporting and investigation of incidents	**Y**	**N**
2.	Incident investigation tracking system in place	**Y**	**N**
3.	Routine root cause analysis completed for incidents	**Y**	**N**
4.	Corrective action program in place (findings and deficiencies identified during incidents reviewed to identify appropriate corrective action, including timely and effective implementation)	**Y**	**N**
K.	**Documents and Records Management**		
1.	System in place to create, distribute, control, and manage documents and records prepared in support of the EH&S program	**Y**	**N**
2.	Designated point of contact in place for records related to the environmental management system.	**Y**	**N**
3.	Written description of the environmental management system in place that describes its organizational and functional structure and elements.	**Y**	**N**
L.	**Program Evaluation**		
1.	Annual evaluation of EH&S management system's implementation and effectiveness	**Y**	**N**
2.	Annual assessment of facility's overall regulatory compliance	**Y**	**N**
3.	Regular review of environmental management system by top management to ensure adequacy and effectiveness	**Y**	**N**
4.	Tracking system in place to measure progress toward attainment of goals of the EH&S program	**Y**	**N**
5.	Periodic reviews to ensure integrity and efficacy of environmental management system and revisions made as necessary	**Y**	**N**
6.	Corrective action program in place (findings and deficiencies identified during program evaluation reviewed to identify appropriate corrective actions and incorporate appropriate corrective actions in the annual EH&S plan)	**Y**	**N**

SECTION 1 — Facility Information

8. Has the facility made an inventory of current or potential environmental impacts associated with its operations, services, and products?

☐ NO ☐ YES If YES, which? ☐ Current ☐ Potential

If yes, did an inventory of environmental impacts affect the facility's ability to manage compliance with environmental regulations?

Explain briefly the level of detail contained in the inventory of environmental impacts and how the inventory has been used.

9. What indicators (for example, environmental indicators such as fines, or pollution prevention indicators such as wastewater discharge) are **being used** in 1998? Please list them in the table below, indicating how they were used and any associated goals or targets established. Please indicate as well whether each item was selected in response to a regulatory requirement.

Indicator	How Used	Goal/Target	Regulatory Requirement?
a.			**Y** **N**
b.			**Y** **N**
c.			**Y** **N**
d.			**Y** **N**
e.			**Y** **N**
f.			**Y** **N**
g.			**Y** **N**

SECTION 1 — Facility Information

Please provide the 1998 values for the indicators listed above (following the example provided).

Indicator	Non-normalized Value	Normalization Factor	Normalized Value
Wastewater discharge	100,000 gal/day	1,000,000 pounds product	0.1 gal/day/pound
a.			
b.			
c.			
d.			
e.			
f.			
g.			

10. Does the facility participate in community outreach activities (for example, reporting of environmental performance, involvement in conservation activities, or marketing energy use)?

☐ NO ☐ YES

If yes, briefly describe the activities and the motivation for participating. Also indicate whether implementation of an EMS has motivated participation or changed the types of activities in which the facility participates (use a separate sheet if additional space is required).

SECTION 2

Several factors can cause or contribute to an incident of noncompliance. The purpose of this section is to determine the **root** and **contributing causes** of the violation(s) listed in the facility profile provided with this survey.

A **root cause** is a primary factor in an incident of noncompliance. For this survey, please identify no more than three root causes for each noncompliance code.

A **contributing cause** is a secondary factor in an incident of noncompliance.

Please follow these instructions for completing the table in this section:

Step 1: Root Cause. In the following table, enter each noncompliance code from the facility profile in the **Root Cause** column next to items that were primary factors in the noncompliance. **For the Root Cause column, enter each noncompliance code no more than three times.**

Step 2: Contributing Cause. On the same table, enter the appropriate noncompliance code from the facility profile in the **Contributing Cause** column next to each item that was a secondary factor in the noncompliance. **Please note that you may enter a noncompliance code in the Contributing Cause column as many times as necessary to describe the secondary factors.**

Categories and Items	Root Cause	Contributing Cause
Human Error		
1. Individual responsibility or professional judgment	_____	_____
2. Fatigue, lack of alertness, distraction	_____	_____
3. Inexperience, lack of knowledge, lack of technical expertise	_____	_____
4. Other (specify) _____	_____	_____
Policies		
5. Unavailable policy	_____	_____
6. Unclear policy	_____	_____
7. Environmental objectives and targets unclear	_____	_____
8. Policy not followed	_____	_____
9. Pollution control technologies or other technical equipment needs not assessed	_____	_____
10. Other (specify) _____	_____	_____

SECTION 2 — Root and Contributing Causes

Categories and Items	Root Cause	Contributing Cause
Procedures		
11. Operating procedure not followed	_____	_____
12. Operating procedure unclear or out-of-date	_____	_____
13. Difficulty in relating operating procedures to actual facility operations and products	_____	_____
14. No written operating procedures available	_____	_____
15. Record keeping procedures inadequate	_____	_____
16. Definition of roles and responsibilities unclear	_____	_____
17. Reporting or notification procedures unclear	_____	_____
18. Pre-startup review omitted or inadequate	_____	_____
19. Other (specify) _____	_____	_____
Management		
20. No formal management structure to address noncompliance and follow-through	_____	_____
21. Management organization undefined	_____	_____
22. Management support or guidance not provided	_____	_____
23. Staffing - inappropriate level or expertise	_____	_____
24. Environmental aspects of facility process and operations not identified	_____	_____
25. Control and oversight of purchased materials, equipment, and services not provided or inadequate	_____	_____
26. Environmental planning or budgeting not completed	_____	_____
27. Result of economic competition	_____	_____
28. Other (specify) _____	_____	_____
Training		
29. Employee not trained	_____	_____
30. Training materials unclear or outdated	_____	_____
31. Training not available	_____	_____
32. Training requirements unclear	_____	_____
33. Other (specify) _____	_____	_____

SECTION 2 — Root and Contributing Causes

Categories and Items	Root Cause	Contributing Cause
Communications - difficulties between		
34. Employees	_____	_____
35. Management and employee	_____	_____
36. Facility and regulatory agencies	_____	_____
37. Other (specify) _____	_____	_____
Emergency Preparedness		
38. Emergency preparedness plan unavailable	_____	_____
39. Emergency preparedness plan insufficient	_____	_____
40. Implementation issues related to the emergency preparedness plan	_____	_____
41. Other (specify) _____	_____	_____
Process Upset or Failure - as a result of		
42. Over pressure	_____	_____
43. Over temperature	_____	_____
44. Runaway reaction	_____	_____
45. Raw material	_____	_____
46. Other (specify) _____	_____	_____
Compliance Monitoring		
47. Audit program insufficient	_____	_____
48. Audit follow-up procedures insufficient	_____	_____
49. Routine site and equipment compliance checks not conducted		
50. No system to ensure timely submittal of environmental reports to regulatory agency	_____	_____
51. Insufficient environmental data	_____	_____
52. Other (specify) _____	_____	_____

SECTION 2 — Root and Contributing Causes

Categories and Items	Root Cause	Contributing Cause
Regulations and Permits		
53. Conflicting permit conditions	_____	_____
54. Ambiguous federal regulations	_____	_____
55. Ambiguous state regulations	_____	_____
56. Regulatory change not communicated by regulatory agency	_____	_____
57. Contradiction between state and federal regulations	_____	_____
58. Inconsistent or contradictory federal regulations	_____	_____
59. Inconsistent or contradictory state regulations	_____	_____
60. Inconsistent or contradictory interpretation of federal regulations	_____	_____
61. Inconsistent or contradictory interpretation of state regulations	_____	_____
62. Facility unaware of applicability of a regulation	_____	_____
63. Rule implementation time frames are too short	_____	_____
64. Other (specify) _____	_____	_____
External Circumstances		
65. An act outside the control of the individuals who operate the process	_____	_____
66. External phenomenon (for example, weather, theft, flood, or fire)	_____	_____
67. Contracted services, such as haulers or handlers	_____	_____
68. Other (specify) _____	_____	_____
Equipment Problems (see the follow-up question on page 14)		
69. Design or installation	_____	_____
70. Equipment maintenance	_____	_____
71. Ordinary wear and tear	_____	_____
72. Site and equipment inspections not conducted	_____	_____
73. Failure to follow up on exceptions noted in inspections	_____	_____
74. Other (specify) _____	_____	_____

SECTION 2 — Root and Contributing Causes

Categories and Items	Root Cause	Contributing Cause
Other Categories or Items (specify)		
75. _____	_____	_____
76. _____	_____	_____
77. _____	_____	_____

Complete the following ONLY if you identified equipment problems as a cause on page 13. Complete the next line to identify which equipment problem you are describing. Check (✔) the appropriate box in the left column to indicate the type of equipment involved and then identify all functions lost using the key at the right.

Item Number _____ **Noncompliance Code** _____

Type of equipment:	**Function(s) lost:**	**Key:**
☐ Piping	_____	**a** Containment
☐ Tanks, vessels, reactors	_____	**b** Process control
☐ Pumps, compressors, blowers, turbines (rotating equipment)	_____	**c** Active mitigation (mechanical systems)
☐ Motors	_____	**d** Passive mitigation (natural systems or intrinsic processes)
☐ Heat exchangers	_____	
☐ Control valves	_____	**e** Material transport
☐ Solids handling	_____	**f** Other (specify)
☐ Instrumentation	_____	_____
☐ Other (specify) _____	_____	

(Use the forms on the next page to describe additional items, if necessary.)

SECTION 3

The purpose of this section is to identify the actions taken to address the violation(s) identified in the facility profile provided with the survey, to identify how the facility verified the effectiveness of those actions, and to describe the lessons learned.

For each action taken, complete all columns. *NOTE: If you need more space, please make copies of the page provided; it follows page 16.*

List the associated noncompliance codes (from the facility profile)	List all specific actions related to the noncompliance taken to prevent recurrence.	How did the facility verify that the action taken would ensure compliance? (For example, was the action verified through a self-assessment audit, root cause analysis, etc.?)	Describe any lessons learned and with whom the facility shared those lessons (for example, trade associations).	Describe any changes, additions, or clarifications to SP001, facility procedures, or the facility's EMS to prevent recurrence of the noncompliance.
a.				
b.				
c.				

SECTION 3 — Response to the Noncompliance

List the associated noncompliance codes (from the facility profile)	List all specific actions related to the noncompliance taken to prevent recurrence.	How did the facility verify that the action taken would ensure compliance? (For example, was the action verified through a self-assessment audit, root cause analysis, etc.?)	Describe any lessons learned and with whom the facility shared those lessons (for example, trade associations).	Describe any changes, additions, or clarifications to SP001, facility procedures, or the facility's EMS to prevent recurrence of the noncompliance.
d.				
e.				
f.				
g.				

SECTION 4

1. Is the facility currently engaged in pollution prevention activities?

   ☐ Yes ☐ No

   If yes, for how long has the facility been engaged in those activities? _____

2. Is a pollution prevention plan required by state law?

   ☐ Yes ☐ No

3. Does the facility currently have a pollution prevention plan?

   ☐ Yes ☐ No

   If yes, when did the facility adopt this plan? _____

4. Please indicate on the check list below which elements of a pollution prevention program are in place at the facility.

Elements of a Pollution Prevention Program	Present in 1990	
A. Policy, Leadership, and Accountability		
1. Designated pollution prevention goals with specific targets for reduction of volume or toxicity	**Y**	**N**
2. Senior operations managers demonstrate commitment and leadership by fostering participation in pollution prevention work groups	**Y**	**N**
B. Organization		
1. Established formal pollution prevention team at the facility level	**Y**	**N**
2. Established formal pollution prevention team at the operations level	**Y**	**N**
3. Established partnership with federal, regional, or state pollution prevention agencies and organizations	**Y**	**N**
4. Employed available federal, state, or other pollution prevention resources, such as agency publications or information clearinghouses	**Y**	**N**

SECTION 4 — Pollution Prevention and Waste Minimization

Elements of a Pollution Prevention Program	Present in 1990	
C. Planning		
1. Developed a facility environmental baseline (in addition to those chemicals and quantities that must be reported to the Toxic Release Inventory under section 313 of the Emergency Planning and Community Right-to-Know Act [EPCRA])	**Y**	**N**
2. Developed a site map as part of the facility environmental baseline. The site map includes the following elements:	**Y**	**N**
A. Discharge points ("outfalls") and the types of pollutants likely to be discharged to each drainage area	**Y**	**N**
B. Discharge patterns and direction of flow	**Y**	**N**
C. Surface-water bodies, including any proximate stream, river, lake, or other body of water that receives storm water discharges from the site	**Y**	**N**
D. Structural control measures (physically constructed features used to control storm water flows)	**Y**	**N**
E. Locations of significant materials exposed to storm water	**Y**	**N**
F. Locations of industrial activities	**Y**	**N**
3. Developed a materials inventory for all pollutants that are produced, handled, stored, treated, or disposed of on-site	**Y**	**N**
4. Identified all sources that generate waste	**Y**	**N**
5. Conducted a pollution prevention opportunity assessment	**Y**	**N**
6. Developed priorities and rank for facility wide pollution prevention activities	**Y**	**N**
7. Established numerical target goals for reducing pollution by a certain amount and a schedule with milestone dates for achieving those goals	**Y**	**N**
8. Identification of obstacles to implementing the pollution prevention plan	**Y**	**N**
9. Use less energy or fewer materials to perform a task by designing new production processes or modifying existing ones or by improving maintenance	**Y**	**N**
10. Consider pollution prevention opportunities from a multimedia perspective (that is, considering air, water, and land as a unified whole, while avoiding the transfer of risk from one medium to another)	**Y**	**N**
11. Application of environmental management hierarchy throughout pollution prevention decision making (that is, source reduction has the highest priority, recycling is the next preferable approach, and treatment and disposal is the last-resort measure)	**Y**	**N**
12. Changing inputs or reducing the reliance on toxic or hazardous raw materials by substituting non-toxic for toxic feedstocks in the manufacture of a product	**Y**	**N**
13. Implementation or participation in EPA's "33/50" Program for the reduction of 17 identified chemical wastes	**Y**	**N**
14. Substitution of environmentally-preferable products for chlorofluorocarbons (CFC) or other ozone-depleting compounds	**Y**	**N**

SECTION 4 — Pollution Prevention and Waste Minimization

Elements of a Pollution Prevention Program	Present in 1990	
C. Planning (continued)		
15. Expanded time horizon analysis for evaluating true economic benefits and costs of pollution prevention	**Y**	**N**
16. Annual plan addresses compliance with legal and company or corporate policies and standards for pollution prevention	**Y**	**N**
17. Annual plan defines timing and responsibility for completion of pollution prevention activities	**Y**	**N**
18. Developed product stewardship plans for all products	**Y**	**N**
D. Rules and Procedures		
1. Perform total cost accounting (or full cost environmental accounting) to allocate direct and indirect costs to specific products and processes	**Y**	**N**
2. Include pollution prevention considerations in production decision making	**Y**	**N**
3. A formal procedure is in place to review pollution prevention opportunities for each new process or process modification	**Y**	**N**
E. Assessment, Control, and Prevention		
1. Maintain a waste tracking system to track all waste generated by type and by process	**Y**	**N**
2. Replace hazardous chemicals with less toxic alternatives that have equivalent performance specifications	**Y**	**N**
3. Improve materials management practices to prevent expiration of or damage to products	**Y**	**N**
4. Consider environmentally conscious design elements for any activity that reduces waste generation through operation and maintenance changes	**Y**	**N**
5. Routinely check storage areas and containers for leaks and spills	**Y**	**N**
6. Maintain equipment in good working order to extend its useful life	**Y**	**N**
7. Keep work areas neat and organized to reduce the chance of spills or releases of chemicals	**Y**	**N**
F. Education and Training		
1. Initial training curriculum is in place that includes pollution prevention policy and practices, risk and hazards, and source reduction opportunities	**Y**	**N**
2. Initial baseline training for engineers and follow-up periodic training on UTC's "Design for Environment" issues	**Y**	**N**
G. Communications		
1. Process is in place to collect and evaluate the comments of **internal** sources as a component of evaluation of the pollution prevention program	**Y**	**N**
2. Written pollution prevention policies and activities available to suppliers	**Y**	**N**
3. Written pollution prevention policies and activities available to customers	**Y**	**N**

SECTION 4 — Pollution Prevention and Waste Minimization

Elements of a Pollution Prevention Program	Present in 1990	
G. Communications (continued)		
4. Written pollution prevention policies and activities available to the public	**Y**	**N**
5. Process is in place to collect and evaluate the comments of **external** sources as a component of evaluation of the pollution prevention program	**Y**	**N**
H. Inspections and Audits		
1. Annual pollution prevention audits performed to identify new opportunities for waste reduction	**Y**	**N**
I. Program Evaluation and Results		
1. Annual review of pollution prevention policy	**Y**	**N**
2. Annual evaluation of implementation and effectiveness of the pollution prevention plan	**Y**	**N**
3. Annual review and analysis of tracking system data to measure progress toward pollution prevention goals and objectives	**Y**	**N**
4. Experienced fewer work-related injuries and exposures of workers to hazardous substances	**Y**	**N**
5. Experienced reduced liability for on- and off-site treatment, storage, and disposal	**Y**	**N**

SECTION 4 — Pollution Prevention and Waste Minimization

5. Do pollution prevention activities at the facility meet the following criteria for success currently?

a. Improved compliance with applicable federal, state, and local environmental requirements and regulations	**Y**	**N**
Please explain _____		
b. Reduced waste management operations or costs and the purchase of raw materials	**Y**	**N**
Please explain _____		
c. Reduced the probability that the facility might cause environmental contamination that may result in environmental liabilities	**Y**	**N**
Please explain _____		
d. Improved the productivity of staff by providing a cleaner, healthier working environment through reduction of the amounts of toxic materials used	**Y**	**N**
Please explain _____		
e. Increased efficiency through innovative pollution prevention techniques identified and implemented under the pollution prevention program	**Y**	**N**
Please explain _____		

SECTION 5

For Reference Only - For Use in Completing Sections 2 and 3

Character Term

A Corrective Action Activities
Although not necessarily indicative of noncompliance with regulations, this category addresses corrective action activities imposed by a legal agreement such as a º3008(h) or º3013 order under RCRA.

B Equipment/Unit Design
Noncompliance resulting from design deficiencies for structures, systems, or resources.

C Exceedance
Failure to meet discharge limit(s), as defined in the facility's permit or by regulation.

D Failure to Respond
Failure to respond to an information request.

E Labeling
General noncompliance with regulations that require labels and placards.

F Legal Agreement
Failure to correct a violation in accordance with any agreement or to achieve a milestone as required under any agreement.

G Monitoring/Detection/Control
Failure to comply with monitoring, detection, or control requirements.

H Operations and Maintenance
General noncompliance of an operational and maintenance nature, such as: the use of defective containers; failure to close hazardous waste containers; lack of aisle space in storage areas; or failure to perform required inspections, calibrations, and maintenance of any equipment.

Character Term

J Record Keeping (incomplete or late)
Noncompliance related to operating records or files, not maintained in accordance with regulations. Includes failure to maintain training records as required by regulation and failure to file complete and accurate manifest reports.

K Report Submissions and Reporting
General failures to submit required reports or the submittal of incomplete or inaccurate reports to the regulating agencies. Includes failure to report spills or releases to the regulating agencies in a timely manner, as defined by regulation.

L Spills/Releases
Noncompliance related to spills or releases.

M Testing
Failure to perform sampling or analysis in accordance with prescribed procedures or permit criteria.

N Training/Certification
Failure to train environmental personnel in the performance of their duties, as specified by regulation (includes inadequate training and failure to conduct refresher training). Includes lack of training and certification records and failure to provide certification training.

O Unpermitted/Unauthorized Activity
Noncompliance resulting from unpermitted or unauthorized activities or equipment. Includes noncompliance with permit requirements and failure to obtain a permit or authorization.

P Waste Identification
Failure to identify or characterize waste as required by regulation.

SECTION 5 — Definitions of Noncompliance Categories / Statutes

Statutes

Character	Statute
1	Clean Air Act (CAA)
2	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
3	Clean Water Act (CWA)
4	Emergency Planning and Community Right-to-Know Act (EPCRA)
5	Resource Conservation and Recovery Act (RCRA)
6	Toxic Substances Control Act (TSCA)

Corporate Survey
for the
Environmental Management System (EMS)
Implementation Study

A joint study by

United States Environmental Protection Agency Region 1

and

United Technologies Corporation

August 10, 1999

If you have any questions about this survey, please contact:

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(617) 918-1837

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Corporate Survey

In 1993, the United States Environmental Protection Agency (EPA) and United Technologies Corporation (UTC) filed a consent decree in the United States District Court for the District of Connecticut settling a multimedia enforcement action. Under the settlement, UTC agreed to develop and implement environmental management systems (EMS) in all of its facilities in New England (currently 19, including Hamilton Standard Division, Pratt & Whitney Division, Sikorsky Aircraft Division, and UT Research Division). EPA and UTC seek to understand the causes of noncompliance and specifically the relationship between environmental performance and the existence and level of implementation of EMSs at the facility level.

The objectives of this project are to:

- Quantify the effect the implementation of an EMS has on compliance
- Quantify the changes in root causes of noncompliance before and after implementation of an EMS at a facility
- Determine whether the level of implementation and acceptance of an EMS has a measurable effect on compliance or on the root causes of noncompliance

For this project, root cause analysis is the process of: (1) identifying factors that caused or contributed to a noncompliance event, (2) evaluating what can be done to prevent such incidents from recurring, and (3) identifying opportunities to improve compliance practices and EMSs.

This corporate survey seeks to gain a historical perspective that will augment the information gathered through the pre-EMS and post-EMS surveys. This survey also will help EPA and industry evaluate traditional and innovative compliance and enforcement activities. The items included seek corporate views about improving compliance with existing regulatory requirements and developing compliance assistance tools and activities. Responses will not be considered a formal petition to amend, modify, or repeal any regulation, nor will responses be used to assess the basis on which a rule was developed.

Corporate Survey

Please use additional paper if more space is needed to answer any of the following questions.

1. The table below contains a list of elements that typically are part of an EMS. Please read the descriptions and check (✓) the appropriate response.

		Part of corporate/ division policy in 1990?	
		Yes (✓)	No (✓)
A.	**Policy and Leadership**		
1.	Goals and objectives statement includes an environmental policy statement.		
2.	Top management defines environmental policy and sets goals and expectations for environmental performance.		
3.	Philosophy of continuous improvement is integrated into the environmental policy.		
4.	Environmental policy includes an explicit written commitment to regulatory compliance and pollution prevention.		
5.	Environmental policy is communicated to all levels of the workforce and is available to the public.		
B.	**Planning**		
1.	Environmental planning is part of the budget and business development process.		
2.	Planning process includes establishment of specific objectives and targets with time frames.		
C.	**Implementation, Operation, and Accountability**		
1.	Formal lines of authority and responsibility and accountability for environmental management have been established.		
2.	Environmental managers have organizational stature, independence, and authority to implement environmental programs and to make decisions about environmental protection.		
3.	Responsibility for environmental management is incorporated into personnel evaluations, rewards, and incentives.		
4.	A system is in place to review environmental procedures and update them periodically.		
5.	A system is in place for tracking and interpreting new federal, state, and local regulations and changes in such regulations and updating facility policies and directives for the organization's response.		
6.	Responsibility and accountability for environmental performance are shared by staff employees and managers at all levels.		
7.	A system is in place through which employees can communicate about environmental issues and concerns directly with top management or environmental managers.		

		Part of corporate/ division policy in 1990?	
		Yes (✓)	No (✓)
C.	**Implementation, Operation, and Accountability (continued)**		
8.	A system is in place to ensure that personnel who have environmental responsibilities have the relevant background and training to carry out their responsibilities.		
9.	A system in place to ensure that environmental reports required by federal and state regulations are prepared routinely and submitted on a timely basis.		
10.	Procedures are established to identify the potential for and response to emergency situations.		
D.	**Performance Measurement and Corrective Action**		
1.	A preventive maintenance program has been developed and implemented to ensure proper operation of pollution control equipment.		
2.	Environmental compliance audits are conducted at least every three years.		
3.	Audits are conducted by persons independent of the unit that is the subject of the compliance audit.		
4.	Compliance audit results are reported directly to facility management.		
5.	A formal system is in place for follow-up of exceptions noted in inspections or audits and supported by management review.		
6.	Periodic audits of the management system are conducted at each facility.		
7.	The integrity and efficacy of the management system are reviewed periodically and revisions are made as necessary.		
8.	A written description of the management system is in place that describes its organizational and functional structure and elements.		
9.	A designated point of contact is in place for records relating to the management system.		
E.	**Management Review and Reporting**		
1.	Top management reviews the EMS regularly to ensure its continuing adequacy and effectiveness.		
2.	Documented review addresses possible need for changes in policy, objectives and other elements of the EMS.		

2. List three regulations (state or federal) under which increased compliance assistance could improve overall environmental compliance. Identify the three regulations with which compliance is most difficult. Identify compliance assistance tools or regulatory reforms that would help ensure compliance with the regulatory provision or language.

Regulatory Provision or Language	Compliance Assistance Tools or Regulatory Reforms

3. Describe any other regulatory reform initiatives or opportunities (existing or future) that would facilitate more efficient compliance with environmental requirements.

4. What industry evaluation methods (for example, compliance audits or EMS audits) could be used as substitutes for traditional compliance inspection, and how could facilities or government demonstrate the credibility of such evaluation methods to the public?

5. What incentives could EPA use to acknowledge or reward sustained compliance?

6. If personnel of regulatory agencies have provided compliance assistance, was that assistance effective?

   ☐ YES ☐ NO

   If YES, who was the government agent (by job description) and what did the agent do? How was that assistance useful?

   If NO, how can regulatory agencies improve their efforts to provide such assistance?

7. In the case of concluded civil or judicial actions that involved your division, could supplemental environmental projects (SEP) have been incorporated to provide more environmentally beneficial settlements? If so, please provide specific examples.

8. Check (✓) the appropriate **YES** or **NO** column to indicate the sources of compliance assistance your division has used. Indicate how useful you found each source by circling the appropriate number. If you did not use a source, indicate how useful you think it would be.

Yes (✓)	No (✓)	Compliance Assistance Sources	Not Very Useful				Very Useful
		Agency hotlines	1	2	3	4	5
		Conferences	1	2	3	4	5
		Consultants	1	2	3	4	5
		Federal employees	1	2	3	4	5
		State employees	1	2	3	4	5
		Your division's employees	1	2	3	4	5
		Internet	1	2	3	4	5
		Other facilities	1	2	3	4	5
		Federal publications	1	2	3	4	5
		State publications	1	2	3	4	5
		State compliance assistance organizations	1	2	3	4	5
		Tools developed by the division	1	2	3	4	5
		Trade associations	1	2	3	4	5
		Universities	1	2	3	4	5
		Vendors and suppliers	1	2	3	4	5
		Other (specify) _____	1	2	3	4	5
		Other (specify) _____	1	2	3	4	5

9. Does your division participate in any voluntary programs sponsored by state or federal regulatory agencies?

☐ YES ☐ NO

If YES, please identify the program(s) and explain its effect on compliance.

If NO, please explain why.

10. On a scale of 1 to 5 (with 5 the most helpful), rate each of the following areas for its helpfulness in improving compliance.

Area	Least Helpful				Most Helpful
More clearly defined commitment on the part of management	1	2	3	4	5
Increased number of employees	1	2	3	4	5
Increased involvement of employees	1	2	3	4	5
Increased involvement of facility management	1	2	3	4	5
Increased exposure of agency personnel to manufacturing operations	1	2	3	4	5
Improved communication between industry and regulatory agency personnel	1	2	3	4	5
Improved access to agency expertise	1	2	3	4	5
Improved communication between the corporate level and facilities	1	2	3	4	5
Improved facility management system	1	2	3	4	5
Improved communication among facilities	1	2	3	4	5
Improved record-keeping procedures	1	2	3	4	5
Improved task-tracking system	1	2	3	4	5
Improved legislative tracking system	1	2	3	4	5
Improved understanding of the regulations	1	2	3	4	5
More clearly defined responsibilities	1	2	3	4	5
More modern equipment	1	2	3	4	5
Other (specify) _____	1	2	3	4	5
Other (specify) _____	1	2	3	4	5

11. Did your division participate in any of the following Region 1 outreach programs? Any state programs?

	Participated?	
	Yes (✓)	No (✓)
A. Emergency Planning and Community Right-to-Know (EPCRA) Workshops		
1. Meeting Your EPCRA Obligations: Current & NEW Requirements (January 13, 1998)		
2. EPCRA Awareness - Do You Know Enough? (February 11, 1998)		
3. Toxics Release Inventory (TRI) Workshops (April 22, 28, and 30 and May 5, 7, 19, and 20, 1998)		
4. TRI "New Industries" Workshops (March 11, 12, 18, and 25, 1998)		
B. Solid Waste and Global Climate Change Events		
1. Northeast Recycling Investment Forum (May 5, 1998)		
2. WasteWise Satellite Forum (June 17, 1998)		
3. Raising Capital: A Practical Seminar for Northeast Recycling Businesses (November 17, 1998)		
4. Pay-as-You-Throw Solid Waste Workshop (June 18, 1998)		
C. Center for Environmental Industry and Technology (CEIT) Events		
1. Stormwater Treatment Technologies Trade Shows (November 17 and 19, June 4, and October 27 and 29, 1998)		
2. Golden Opportunities Seminar Series for Environmental Technology Innovation, Environmental Technology Verification: Accelerating the Commercialization of Innovative Environmental Technologies (December 9, 1997)		
3. On-Site Insights Workshop: Innovative Technologies for Site Assessment and Monitoring (March 30, 1998)		
4. Small Systems Water Treatment Technologies: State-of-the-Art Workshop (April 1, 1998)		
5. Innovative On-Site Wastewater Technologies Trade Shows (April 6 and 8, 1998)		
6. Workshop for Increasing the Use of Innovative Technologies on Small Hazardous Waste and Petroleum Sites (April 28, 1998)		
7. Environmental Venture Capital Forum (May 7, 1998)		
8. EPA Regional Conference, Implementing an Action Plan for a Sustainable New England—Opportunities for the Environmental Industry and Other Businesses: A Continuing Dialogue with the White House and Federal Agencies (March 7, 1998)		

Corporate Survey

	Participated?	
	Yes (✓)	No (✓)
D. New England Environmental Assistance Team (NEEATeam) Events		
1. ACIDS AND BASES: Reducing Cost and Waste, a One-Day Workshop on Pollution Prevention Opportunities (April 28 and May 12 and 19, 1998)		
2. Expecting Inspections: Environmental Compliance and Pollution Prevention for Municipal Highway Garages (June 24 and July 8, 15, and 22, 1998)		
3. Chemical Industry Audit Project: Focus Group (November 24, 1997)		
4. Chemical Industry Audit Project: Environmental Regulations for the Chemical Industry Workshops (May 28 and June 2 and 11, 1998)		
5. Chemical Industry Audit Project: Compliance Assistance Workshops for the Chemical Industry (February 10, 17, 23 and 25, 1998)		
6. Environmental Regulations/Job and Classroom Resources (October 29, 1997)		
7. Maximum Achievable Technology Standard (MACT) Workshop for the Aerospace Industry (August 4, 1998)		
8. RCRA Subpart CC Compliance Assistance (Organic Air Emission Standards for Containers and Tanks) Seminars (June 23 and 25, 1998)		
9. Metal Finishing Workshop: An Update on Regulations and New Technologies for the Metal Plating and Finishing Industries (September 30, 1998)		
10. New England Auto Air-Conditioning Workshop and Technology Trade Show: Regulations, Retrofit Procedures and New Technologies (March 28, 1998)		
11. Printwise Technology Open House (October 21, 1997)		
E. Innovative Environmental Performance (IEP) Team Events		
1. Star Track Opening Conference (June 24, 1998)		
F. Other Region 1 Outreach Programs (Please list title and date)		
1.		
2.		
G. State Outreach Programs (Please list title and date)		
1.		
2.		
3.		
4.		